

What is claimed is:

- 1 1. A method for verification of command processing in a computer system design having
2 a multiple priority command queue, the method comprising:
 - 3 (a) inputting over time, multiple simulated requests into a simulation model of
4 said computer system, each request having a priority and each request comprising a stage
5 (1) request and tag transaction, a stage (2) command ID transaction, a stage (3) command
6 system ID transaction, a stage (5) system combined response transaction and a stage (7)
7 completion tag transaction;
 - 8 (b) sorting the priority of each request based on the stage (1) request and tag
9 transaction of each request;
 - 10 (c) issuing an error if any particular stage (2) command ID transaction is not a
11 transaction of a request previously sorted in step (b) or is not a retry stage (2) command
12 ID;
 - 13 (d) issuing an error or ignoring a particular stage (3) command system ID
14 transaction if said particular stage (3) command system ID transaction is not a transaction
15 of a request having a previously issued stage (2) command ID transaction;
 - 16 (e) issuing an error or ignoring a particular stage (5) system combined response if
17 said particular stage (5) system combined response transaction is not a transaction of a
18 request having a previously issued stage (3) command system ID transaction; and

19 (f) issuing an error if any particular stage (7) completion tag transaction is not a
20 transaction of a request having a previously issued stage (5) system combined response
21 transaction.

1 2. The method of claim 1, wherein in step (a):

2 stage (1) request and tag transactions, stage (2) command ID transactions, stage
3 (3) command system ID transactions, stage (5) system combined response transactions
4 and stage (7) completion tag transactions of different requests are intermingled by said
5 simulation model; and

6 a stage (1) request and tag transaction, a stage (2) command ID transaction, a
7 stage (3) command system ID transaction, a stage (5) system combined response
8 transaction and a stage (7) completion tag transaction of a same request occur in the order
9 listed.

1 3. The method of claim 1, wherein step (b) includes entering each stage (1) request and
2 tag transaction of each request into one of two or more priority lists based on the priority
3 of each request.

1 4. The method of claim 3, wherein step (c) includes moving an entry corresponding to
2 said particular entry stage (2) command ID transaction from one of said two or more
3 priority lists to an issued list and writing a packet ID transaction of said particular entry

4 stage (2) command ID transaction to a corresponding field of the moved entry in said
5 issued list.

1 5. The method of claim 4, wherein step (c) further includes:

2 issuing an error if all priority lists and said issued list are empty;

3 issuing an error if an entry in said issued list corresponding to said particular entry

4 stage (2) command ID transaction is not flagged as a retry; and

5 issuing an error if said particular entry stage (2) command ID transaction is not the

6 first entry in one of said two or more priority lists.

1 6. The method of claim 4, wherein step (d) includes:

2 writing a system ID transaction of said particular stage (3) command system ID

3 transaction to a corresponding field in said corresponding entry of said issued list; and

4 step (e) includes:

5 writing said particular stage (5) system combined response transaction to a

6 corresponding entry of said issued list;

7 generating an error or ignoring said particular stage (3) command system

8 ID if an entry corresponding to said particular stage (3) command system ID

9 transaction does not exist in said issued list; and

10 generating error an or ignoring said particular stage (5) system combined
11 response if an entry corresponding to said particular stage (5) system combined
12 response transaction does not exist in said issued list.

1 7. The method of claim 6, wherein step (e) further includes:

2 removing an entry corresponding to said particular stage (7) completion tag
3 transaction from said issued list; and
4 generating an error if said corresponding entry does not exist in said issued list.

1 8. The method of claim 7, further including:

2 (g) generating an error if said two or more priority lists and said issued list are not
3 empty after all stage (1) request and tag transactions, all stage (2) command ID
4 transactions, all stage (3) command system ID transactions, all stage (5) system combined
5 response transactions and all stage (7) completion tag transactions of all said simulated
6 requests have been inputted and processed by said simulation model.

1 9. The method of claim 1, wherein step (e) further includes generating an error if said
2 particular stage (5) system combined response is a retry.

1 10. A method for verification of command processing in a computer system design
2 having a multiple priority command queue, the method comprising:
3 (a) inputting over time, multiple simulated requests into a simulation model of
4 said computer system, each request having a priority and each request comprising a stage
5 (1) request and tag transaction, a stage (2) command ID transaction, a stage (3) command
6 system ID transaction, a stage (5) system combined response transaction and a stage (7)
7 completion tag transaction;
8 (b) entering into one of two or more priority lists a tag and a priority for each
9 particular stage (1) request and tag transaction upon input of each particular stage (1)
10 request and tag transaction;
11 (c) moving an entry corresponding to each particular stage (2) command ID
12 transaction from one of said two or more priority lists to an issued list upon input of each
13 particular stage (2) command ID transaction of a request and writing a packet ID from
14 said particular stage (2) command ID transaction to a packet ID field in said entry;
15 (d) writing to a system ID field in an entry of said issued list corresponding to
16 each particular stage (3) command system ID transaction, a system ID from said
17 particular stage (3) command system ID transaction;
18 (e) writing to a system combined response field in an entry of said issued list
19 corresponding to each particular a stage (5) system combined response transaction, a
20 system combined response; and

21 (f) deleting from said issued list each entry corresponding to each stage (7)
22 completion tag transaction.

1 11. The method of claim 10, wherein in step (a):

2 stage (1) request and tag transactions, stage (2) command ID transactions, stage
3 (3) command system ID transactions, stage (5) system combined response transactions
4 and stage (7) completion tag transactions of different requests are intermingled by said
5 simulation model; and

6 a stage (1) request and tag transaction, a stage (2) command ID transaction, a
7 stage (3) command system ID transaction, a stage (5) system combined response
8 transaction and a stage (7) completion tag transaction of a same request occur in the order
9 listed.

1 12. The method of claim 10, wherein step (c) includes:

2 issuing an error if all priority lists and said issued list are empty;

3 issuing an error if an entry in said issued list corresponding to said particular entry
4 stage (2) command ID transaction is not flagged as a retry; and

5 issuing an error if said particular entry stage (2) command ID transaction is not a
6 first entry in one of said two or more priority lists.

1 13. The method of claim 10, wherein step (d) includes:
2 issuing an error or ignoring a particular stage (3) command system ID transaction
3 if a packet ID of said particular stage (3) command system ID transaction does not match
4 a packet ID in said issued list.

1 14. The method of claim 10, wherein step (e) includes:
2 issuing an error or ignoring any particular stage (5) system combined if a system
3 ID of said any particular stage (5) system combined response does not match a system ID
4 in said issued list.

1 15. The method of claim 10, wherein step (f) includes:
2 issuing an error if a tag of said particular stage (7) completion tag transaction does
3 not match a tag in said issued list.

1 16. The method of claim 10, further including:
2 (g) generating an error if said two or more priority lists and said issued list are not
3 empty after all stage (1) request and tag transactions, all stage (2) command ID
4 transactions, all stage (3) command system ID transactions, all stage (5) system combined
5 response transactions and all stage (7) completion tag transactions of all said simulated
6 requests have been inputted and processed by said simulation model.

1 17. A computer system comprising a processor, an address/data bus coupled to said
2 processor, and a computer-readable memory unit adapted to be coupled to said processor,
3 said memory unit containing instructions that when executed by said processor implement
4 a method for method for verification of command processing in a computer system design
5 having a multiple priority command queue, said method comprising the computer
6 implemented steps of:

7 (a) inputting over time, multiple simulated requests into a simulation model of
8 said computer system, each request having a priority and each request comprising a stage
9 (1) request and tag transaction, a stage (2) command ID transaction, a stage (3) command
10 system ID transaction, a stage (5) system combined response transaction and a stage (7)
11 completion tag transaction;

12 (b) entering into one of two or more priority lists a tag and a priority for each
13 particular stage (1) request and tag transaction upon input of each particular stage (1)
14 request and tag transaction;

15 (c) moving an entry corresponding to each particular stage (2) command ID
16 transaction from one of said two or more priority lists to an issued list upon input of each
17 particular stage (2) command ID transaction of a request and writing a packet ID from
18 said particular stage (2) command ID transaction to a packet ID field in said entry;

19 (d) writing to a system ID field in an entry of said issued list corresponding to
20 each particular stage (3) command system ID transaction, a system ID from said
21 particular stage (3) command system ID transaction;

22 (e) writing to a system combined response field in an entry of said issued list
23 corresponding to each particular a stage (5) system combined response transaction, a
24 system combined response; and
25 (f) deleting from said issued list each entry corresponding to each stage (7)
26 completion tag transaction.

1 18. The system of claim 17, wherein in method step (a):
2 stage (1) request and tag transactions, stage (2) command ID transactions, stage
3 (3) command system ID transactions, stage (5) system combined response transactions
4 and stage (7) completion tag transactions of different requests are intermingled by said
5 simulation model; and
6 a stage (1) request and tag transaction, a stage (2) command ID transaction, a
7 stage (3) command system ID transaction, a stage (5) system combined response
8 transaction and a stage (7) completion tag transaction of a same request occur in the order
9 listed.

1 19. The system of claim 17, wherein method step (c) includes:
2 issuing an error if all priority lists and said issued list are empty;
3 issuing an error if an entry in said issued list corresponding to said particular entry
4 stage (2) command ID transaction is not flagged as a retry; and

5 issuing an error if said particular entry stage (2) command ID transaction is not the
6 first entry in one of said two or more priority lists.

1 20. The system of claim 17, wherein method step (d) includes:

2 issuing an error or ignoring a particular stage (3) command system ID transaction
3 if a packet ID of said particular stage (3) command system ID transaction does not match
4 a packet ID in said issued list.

1 21. The method of claim 17, wherein method step (e) includes:

2 issuing an error or ignoring any particular stage (5) system combined response if a
3 system ID of said any particular stage (5) system combined response does not match a
4 system ID in said issued list.

1 22. The system of claim 17, wherein method step (f) includes:

2 issuing an error or ignoring a particular stage (7) completion tag transaction if a
3 tag of said particular stage (7) completion tag transaction does not match a tag in said
4 issued list.

1 23. The system of claim 17, further including the method steps of:

2 (g) generating an error if said two or more priority lists and said issued list are not
3 empty after all stage (1) request and tag transactions, all stage (2) command ID

- 4 transactions, all stage (3) command system ID transactions, all stage (5) system combined
- 5 response transactions and all stage (7) completion tag transactions of all said simulated
- 6 requests have been inputted and processed by said simulation model.